



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/815,562	03/23/2001	Reiko Kondo	0941.65367	7473

24978 7590 11/18/2003

GREER, BURNS & CRAIN
300 S WACKER DR
25TH FLOOR
CHICAGO, IL 60606

EXAMINER

CAO, ALLEN T

ART UNIT	PAPER NUMBER
----------	--------------

2652

DATE MAILED: 11/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/815,562

Applicant(s)

KONDO, REIKO

Examiner

Allen T Cao

Art Unit

2652

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 2652

1. Applicant's election without traverse of Group I, claims 1-6 in Paper No. 4 is acknowledged.

2. Claims 7-9 had been cancelled.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komuro et al (US. 6,587,318 B2) in view of Kawato et al (US. 6,327,123 B1).

Komuro et al (particularly figure 7) disclose a magnetic head having a magnetoresistive film 20 including a ferromagnetic free layer 3 at a top part thereof the ferromagnetic free layer changing a magnetization thereof to an external magnetic field (throughout the Komuro's specification, for example: column 4, lines 12-21 and 34-37; and column 6, lines 45-51); first and second magnetic domain control patterns (7, 7) provided on the side of the free layer 3, each of the first and second magnetic domain control patterns causing a pinning of magnetization in the free layer in the vicinity thereof (column 4, lines 34-37); a first electrode 9(5) provided on the free layer 3 in contact therewith at a region located between the first and second magnetic domain control patterns; and a second electrode 8 provided in electrical contact with a bottom surface of the MR film 20 as set forth in claims 1 and 5.

Art Unit: 2652

Regarding claim 5, Komuro et al also disclose a magnetic apparatus (figure 10) having a rotary magnetic disk 110 and a magnetic head 210 scanning over a surface of the magnetic disk 110.

Regarding claim 2, Komuro et al disclose a first insulation 6 (figure 7 and column 9, lines 12-16) covering the first magnetic domain pattern 7 and a second insulating film 6 (the other side of the magnetic domain) covering the second magnetic domain control patterns, such that the first insulating film 6 is interposed between the first magnetic domain control pattern and the first electrode 9(5) and such that the second insulating film 6 is interposed between the second magnetic domain control pattern 7 and the first electrode 9(5) as claimed.

Regarding claim 3, Komuro et al inherently disclose that the first and second insulating films have a generally identical thickness.

Komuro et al only disclose that the magnetic domain control films 7 are formed on the free layer 3 (figure 12C) and then polished to the flat surface (figure 12D). Komuro et al do not clearly disclose that the magnetic domain control films are formed on the free layer as recited in claims 1 and 5.

Kawato et al disclose a magnetic head having a MR film including a free layer 21, domain magnetic control films 41 and electrodes (25a, 25b); wherein, the magnetic domain control layers are formed on the free layer 21 (figure 7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the MR head of Komuro et al such that the domain control layers are formed on the free layer as taught by Kawato et al.

Art Unit: 2652

The rationale is as follows: One of ordinary skill in the art would have been motivated to modify the MR head of Komuro et al such that the domain control layers are formed on the free layer as taught by Kawato et al to improve the magnetization between the free layer and magnetic domain control layers in order to improve read/write characteristics of the MR head.

Regarding claims 4 and 6, Komuro et al disclose a magnetic apparatus (figure 10) having a rotary magnetic disk 110 and a magnetic head 210 scanning over a surface of the magnetic disk 110. Komuro et al (particularly figure 7) also disclose a magnetic head having a magnetoresistive film 20; first and second magnetic domain control patterns (7, 7) provided at both lateral sides of the MR film 20, each of the first and second magnetic domain control patterns causing a pinning of magnetization in the free layer in the vicinity thereof (column 4, lines 34-37); a pair electrodes (9(5) and 8) provided on the MR as set forth in claims 4 and 6.

Komuro et al do not disclose that 1) both of the electrodes are provided on the magnetic domain control regions and each electrode having a tip end part extending over the magneto resistive film toward the other electrode; 2) each tip end part extends beyond the domain control region, on which the electrode having the tip end part is provided, with a protruding distance of 0.25 μm or less.

Kawato et al disclose a magnetic head having a MR film including domain magnetic control films 41 and electrodes (25a, 25b); wherein, the electrodes are provided on the magnetic domain control layers (figure 7), and each electrode having a tip end part extending over the magneto resistive film toward the other electrode; each

Art Unit: 2652

tip end part extends beyond the domain control region, on which the electrode having the tip end part is provided, with a protruding distance of 0.5 μm .

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the MR head of Komuro et al with that the electrodes are provided on the magnetic domain control layers (figure 7), and each electrode having a tip end part extending over the magneto resistive film toward the other electrode as taught by Kawato et al.

The rationale is as follows: One of ordinary skill in the art would have been motivated to modify the MR head of Komuro et al with that the electrodes are provided on the magnetic domain control layers (figure 7), and each electrode having a tip end part extending over the magneto resistive film toward the other electrode as taught by Kawato et al to improve the magnetization between the free layer and magnetic domain control layers in order to improve read/write characteristics of the MR head.

Kawato et al disclose that each tip end part of the electrodes extends beyond the domain control region, on which the electrode having the tip end part is provided, with a protruding distance of 0.5 μm . Kawato et al do not disclose that the protruding distance is of 0.25 μm or less.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the protruding distance of MR head of Komuro et al as modified by Kawato et al to be 0.25 μm or less instead of 0.5 μm .

The rationale is as follows: One of ordinary skill in the art would have been motivated to modify the protruding distance of MR head of Komuro et al as modified by

Art Unit: 2652

Kawato et al to be 0.25 μm or less instead of 0.5 μm through resizing the distance of the protruding from 0.5 μm to 0.25 μm or less to improve the reproducing sensitivity of the head as taught by Kawato et al in column 8, lines 39-43).

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Dykes et al (US. 5,668,688), Sun et al (US. 6,574,079 B2), Ravipati et al (US. 5,438,470), and Hosomi et al (US. 6,535,363 B1).

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen T Cao whose telephone number is (703) 305-3796. The examiner can normally be reached on Tue - Fri (7:30 - 6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-7201.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.



Allen Cao
Primary Examiner

AC
November 14, 2003